
Suisun Marsh Monitoring Program Channel Water Salinity Report

Reporting Period: November 2011

Questions regarding this report should be directed to:

Bill Burkhard

California Department of Water Resources
Division of Environmental Services
3500 Industrial Blvd
West Sacramento, CA 95691

Telephone: (916) 376--9761
burkhard@water.ca.gov

TABLE OF CONTENT

1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT	1
2. MONITORING RESULTS.....	2
2.1 CHANNEL WATER SALINITY COMPLIANCE	2
2.2 DELTA OUTFLOW	2
2.3 RAINFALL	3
2.4 SUISUN MARSH SALINITY CONTROL GATE (SMSCG) OPERATIONS	3
3. DISCUSSION.....	3
3.1 FACTORS AFFECTING CHANNEL WATER SALINITY IN THE SUISUN MARSH	3
3.2 OBSERVATIONS AND TRENDS.....	4
3.2.1 <i>Conditions during the Reporting Period</i>	4
3.2.2 <i>Comparison of Reporting Period Conditions with Previous Years</i>	4

4. List of Figures

- Figure 1: Suisun Marsh Progressive Mean High Tide Specific Conductance for compliance stations
Figure 2: Suisun Marsh Progressive Mean High Tide Specific Conductance for monitoring stations
Figure 3: Daily Net Delta Outflow Index and Precipitation
Figure 4: 10-yr Comparison of Monthly Values of Monthly Mean Specific Conductance at High Tide for compliance and monitoring stations
Figure 5: Map of compliance and monitoring stations, and control facilities in Suisun Marsh

1. SUISUN MARSH MONITORING STATIONS AND REPORTING REQUIREMENT

As per SWRCB Water Rights Decision 1641, dated December 29, 1999, and previous SWRCB decisions, the California Department of Water Resources (DWR) is required to provide monthly channel water salinity compliance reports for the Suisun Marsh to the SWRCB. Conditions of channel water salinity in the Suisun Marsh are determined by monitoring specific electrical conductivity, which is referred as "specific conductance" (SC). The locations of all listed stations are shown in Figure 5.

The monthly reports are submitted for October through May each year in accordance with SWRCB requirements. The reports are required to include salinity data from the stations listed below to ensure salinity standards are met to protect habitat for waterfowl in managed wetlands:

Station Identification	Station Name	General Location	Classification
C-2*	Collinsville	Western Delta	Compliance Station
S-64	National Steel	Eastern Suisun Marsh	Compliance Station
S-49	Beldon's Landing	North-Central Suisun Marsh	Compliance Station
S-42	Volanti	North-Western Suisun Marsh	Compliance Station
S-21	Sunrise	North-Western Suisun Marsh	Compliance Station

Data from the stations listed below are included in the monthly reports to provide information on salinity conditions in the western Suisun Marsh.

Station Identification	Station Name	General Location	Classification
S-97	Ibis	Western Suisun Marsh	Monitoring Station
S-35	Morrow Island	South-Western Suisun Marsh	Monitoring Station

Information on Delta outflow, area rainfall, and operation of the Suisun Marsh Salinity Control Gates are also included in the monthly reports to provide information on conditions that may affect channel water salinity in the Marsh.

* Throughout the report, the representative data from nearby USBR station is used in lieu of data from station C-2.

2. Monitoring Results

2.1 Channel Water Salinity Compliance

During the month of November, 2011, salinity conditions at all five compliance stations are in compliance with channel water salinity standards of (Table 1). Compliance with standards for the month of November was determined for each compliance station by comparing the progressive daily mean of high-tide SC with respective standards. The standard for compliance stations C-2, S-64, and S-49 were 15.5 mS/cm and 16.5 mS/cm for S-21 and S-42 during November 2011. Table 1 lists monthly mean high-tide SC at these compliance stations. The progressive daily mean (PDM) is the monthly average of both daily high-tide SC values. The mathematical equation is shown below.

$$\text{PDM} = \frac{\sum \text{daily average of high tide SC}}{\text{\# days of the month}}$$

2.2 Delta Outflow

Outflow for November 2011 ranged between 4,000 cfs and 15,000 cfs. The first precipitation event resulted outflow to increase to about 6,600 cfs in early November before dropping off briefly to about 4,200 cfs, then gradually increase thereafter. The next several precipitation events raised outflow to increase in the second half of the month to a peak flow of about 14,000 cfs then decreased slightly to end the month above 12,000 cfs. The monthly Delta outflow is represented by the mean Net Delta Outflow Index (NDOI). The NDOI is the estimated daily average of Delta outflow. Mean NDOI for November 2011 is listed below:

Month	Mean NDOI (cubic feet per second)
November	8,221

2.3 Rainfall

November 2011 rainfalls occurred mostly in the second half of the month. The first rainfall occurred in early November, and the remaining rainfalls were late in the month. All the rain events were less than 0.40 inches, with the largest daily amount occurring on the 18th and 20th. The monthly total is below:

Month	Total Rainfall (inches)
November	1.25

2.4 Suisun Marsh Salinity Control Gate (SMSCG) Operations

Operations and flashboard/boat lock installations at the SMSCG during November 2011 is summarized below.

Date	Gate status	Flashboards status	Boat Lock status
November 1 – 30	3 Open	In	Closed

Salinity conditions remains low in the marsh, thus gate operation was not warranted in November 2011. DWR will continue to monitor salinity levels and will initiate gate operations if salinity becomes a concern. Boat lock gates are closed due to ongoing investigation on safety concerns expressed by DFD staff. NOAA was briefed about the safety concern and will schedule a field visit to assess options with DWR to balance fish needs and safety needs.

3. Discussion

3.1 Factors Affecting Channel Water Salinity in the Suisun Marsh

Factors that affect channel water salinity levels in the Suisun Marsh include:

- delta outflow;
- tidal exchange;
- rainfall and local creek inflow;
- managed wetland operations; and,
- operations of the SMSCG and flashboard configurations.

3.2 Observations and Trends

3.2.1 Conditions during the Reporting Period

During November 2011 PDM salinity levels at Collinsville(C-2), National Steel(S-64), Beldons (S-49), and Volanti(S-42) ranged between 2.0 mS/cm and 9.5 mS/cm as shown in Figure 1. Salinity levels were stable throughout the month with a slight increase at all compliance stations.

Monitoring stations, S35 and S97 salinity levels were also stable throughout November and ranged between 9.0 mS/cm and 10.0 mS/cm as shown in Figure 2.

3.2.2 Comparison of Reporting Period Conditions with Previous Years

Monthly mean high-tide SC at the compliance and monitoring stations for November 2011 were compared with means for those months during the previous nine years (Figure 4).

Mean salinity pattern of all compliance and monitoring stations was the lowest of all the past 10 years for November. Compared to previous nine years, November 2011 salinity levels overall were ranked last in high Specific Conductance. The low salinity was a carryover of a wet year and a cool summer resulting in salinity levels to continually remain low throughout the marsh.

Table 1**Monthly Mean High Tide Specific Conductance at Suisun Marsh
Water Quality Compliance Stations****November 2011**

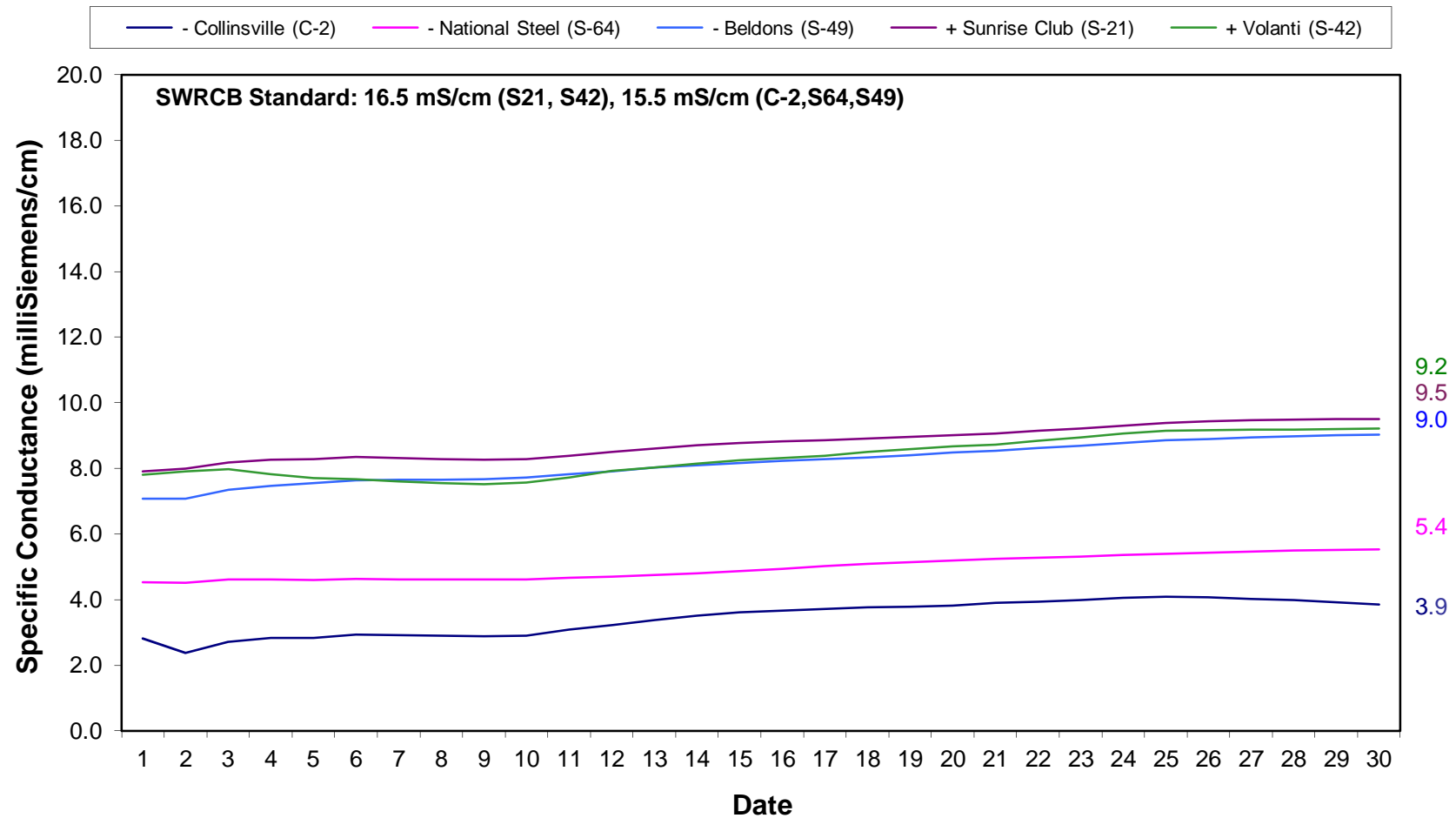
Station	Specific Conductance (mS/cm)*	Deficiency Standard	Deficiency Standard meet?
C-2**	3.9	15.5	Yes
S-64	5.5	15.5	Yes
S-49	9.0	15.5	Yes
S-42***	9.2	16.5	Yes
S-21***	9.5	16.5	Yes

*milliSiemens per centimeter

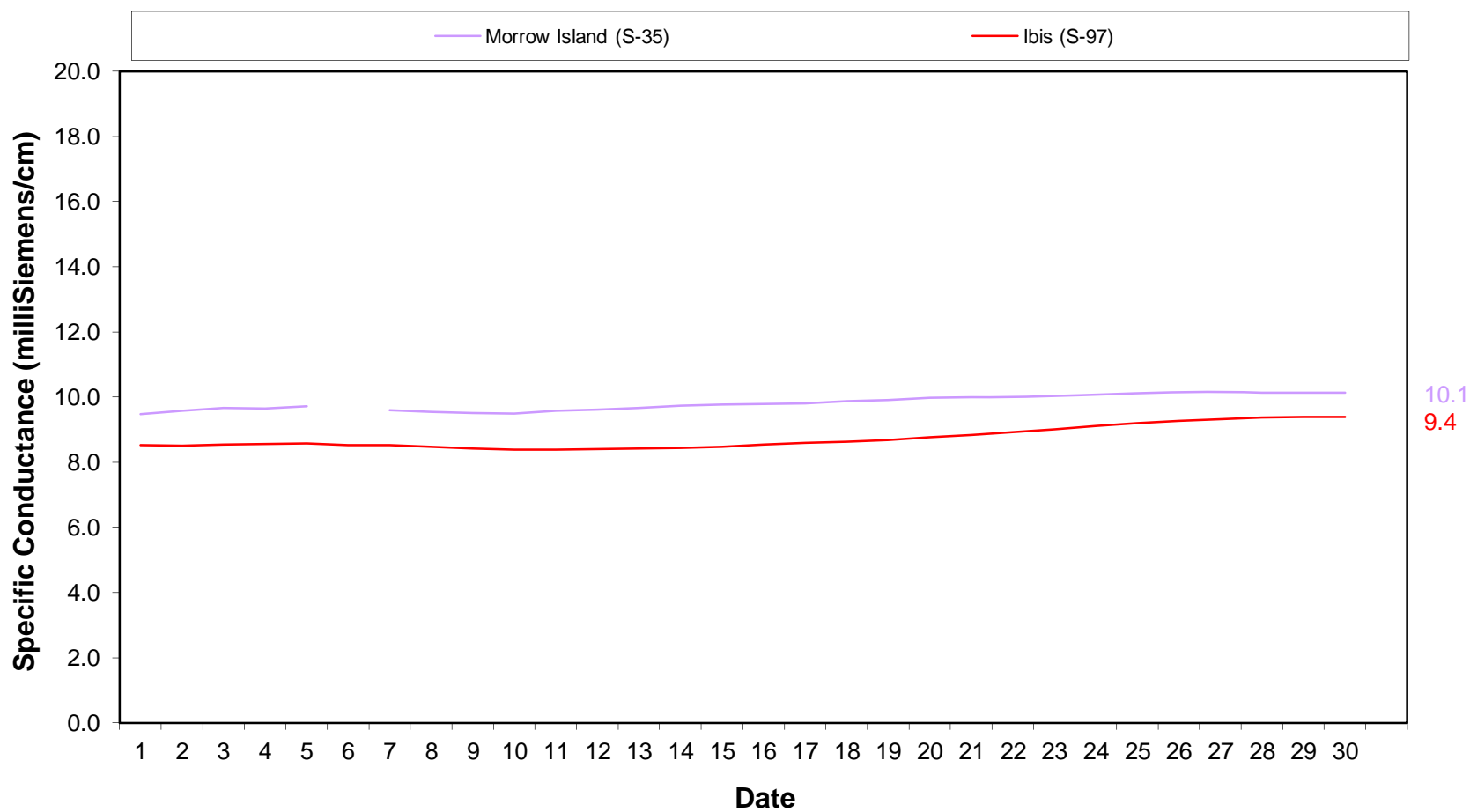
**The representative data from nearby USBR station is used in lieu of data from station C-2.

***value does not represent end of month value due to missing data; however more than likely the standard was met at these stations because neighboring stations salinity indicate that salinity levels were stable for the most part of the month.

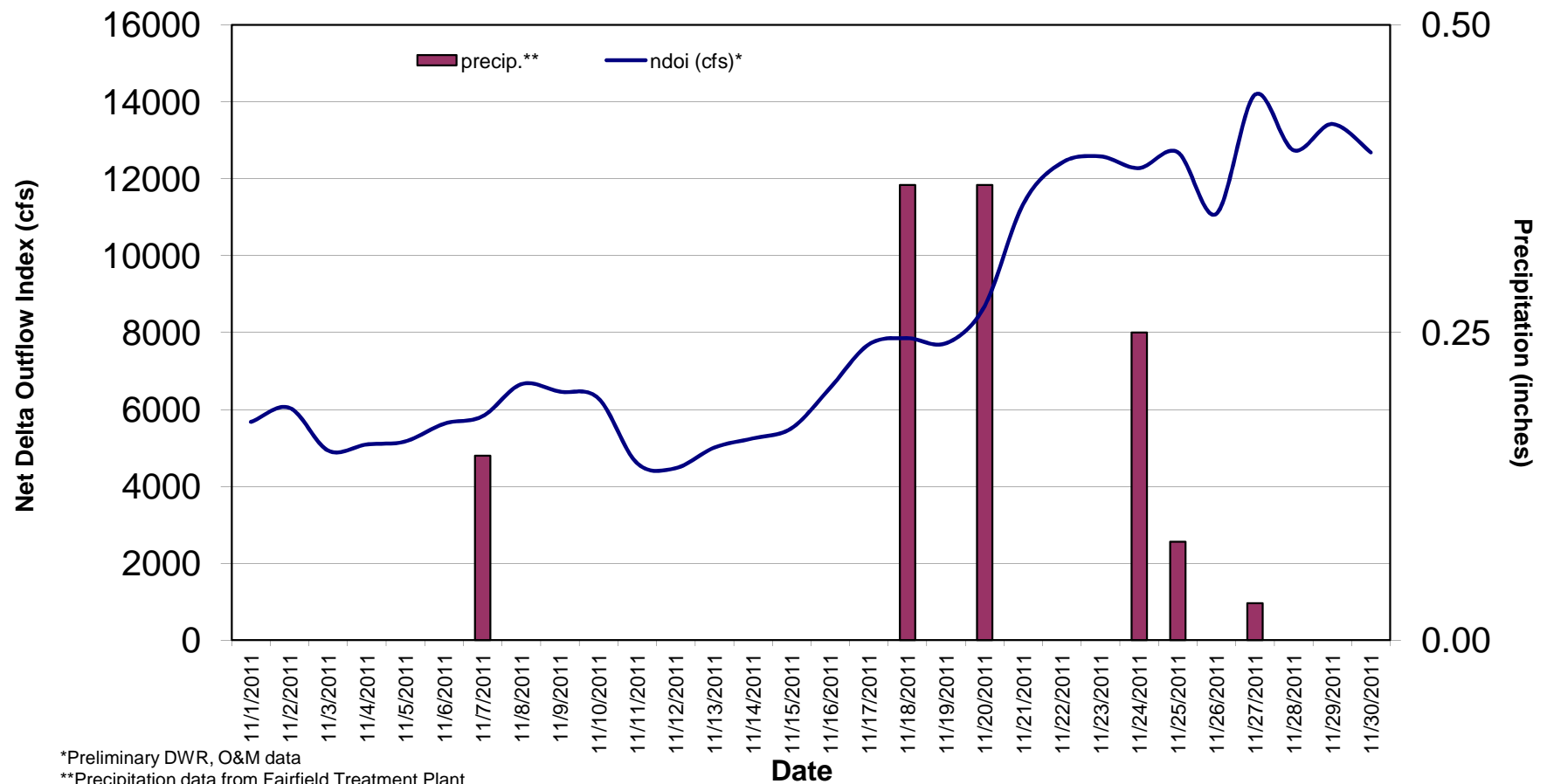
Figure 1 - Suisun Marsh Progressive Mean High-Tide Specific Conductance for November 2011



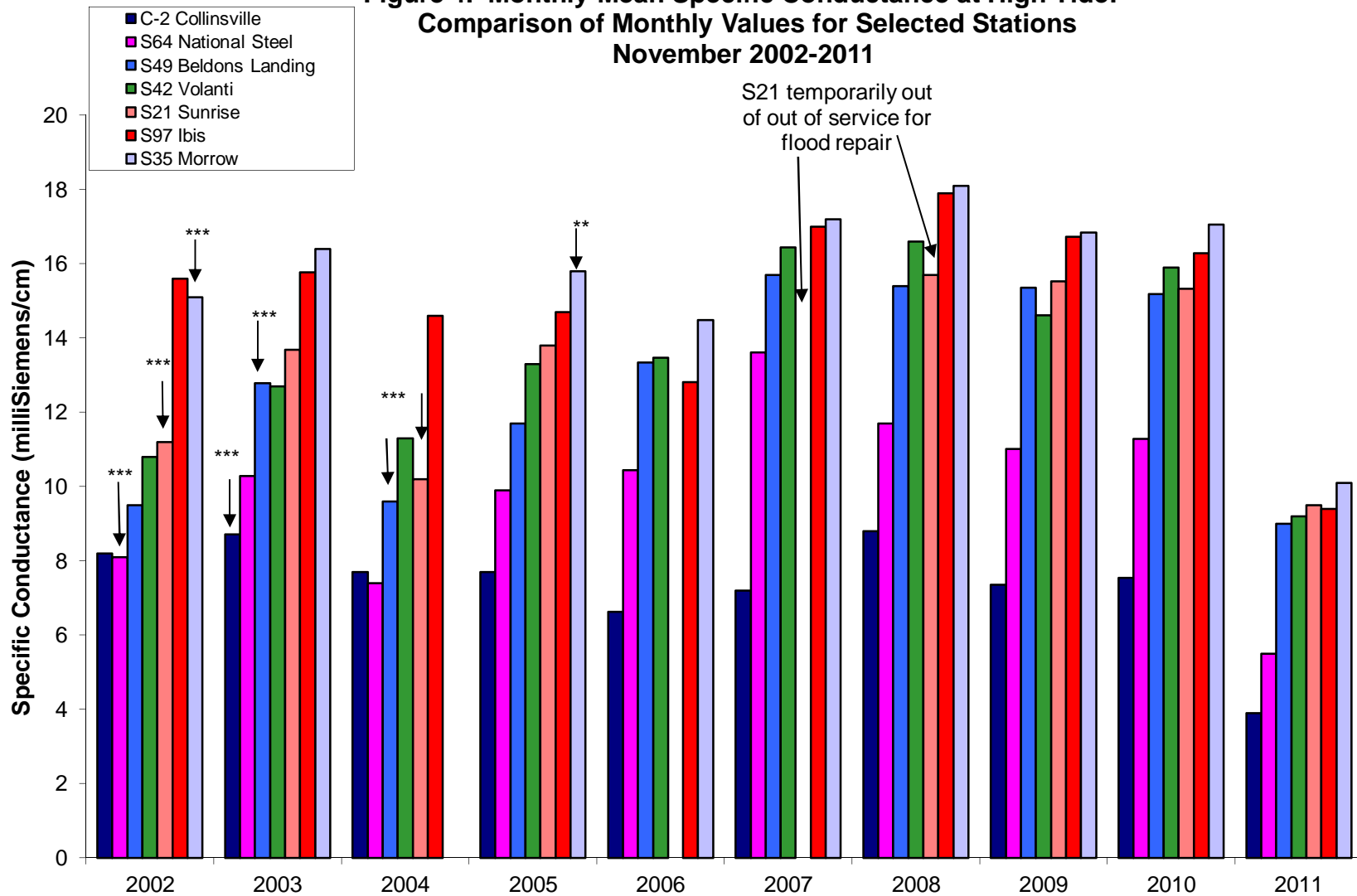
**Figure 2. Suisun Marsh Progressive Mean High-Tide Specific Conductance
at Monitoring Stations S35 and S97
November 2011**



**Figure 3. Daily Net Delta Outflow Index and Precipitation
November 2011**



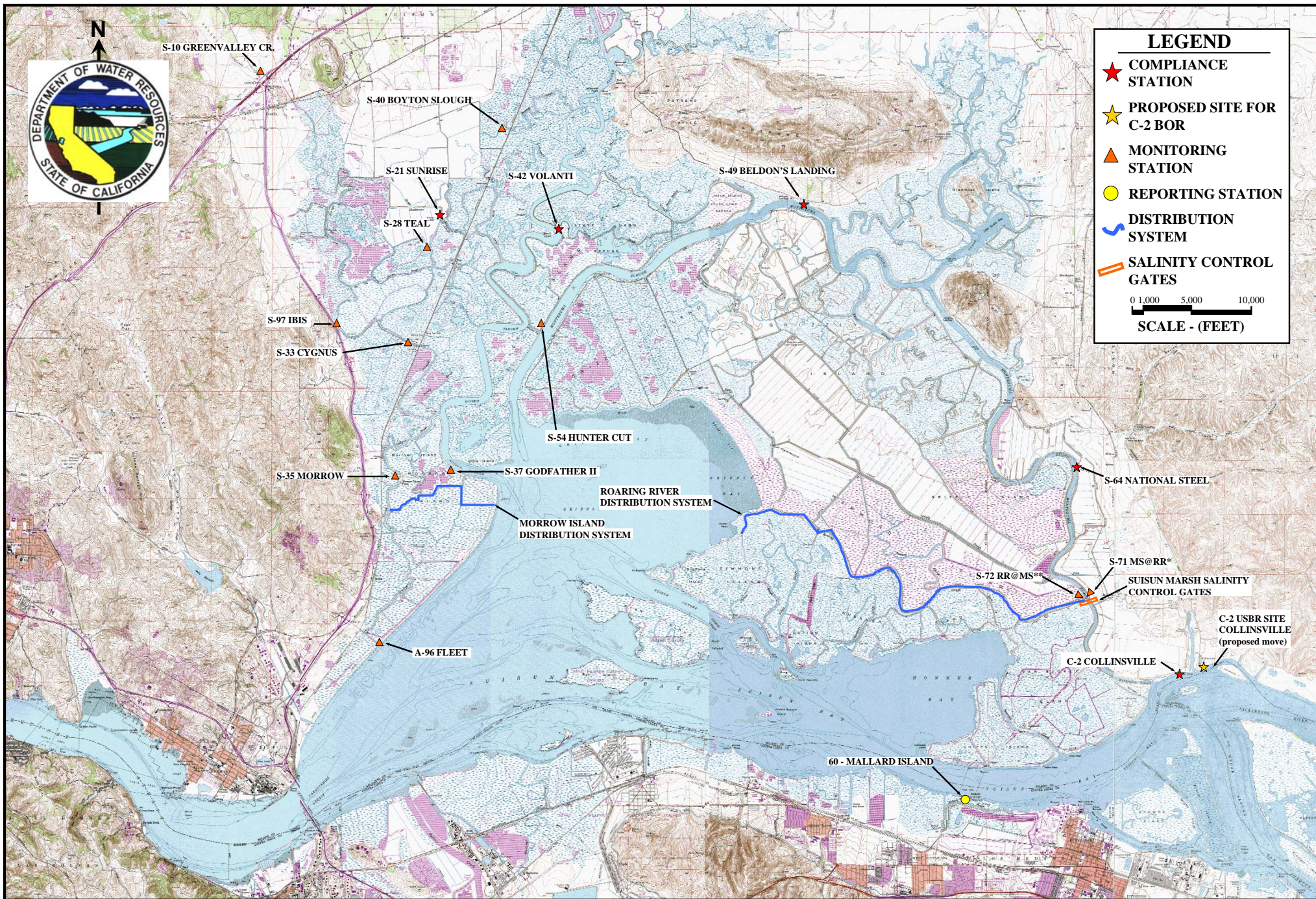
**Figure 4. Monthly Mean Specific Conductance at High Tide:
Comparison of Monthly Values for Selected Stations
November 2002-2011**



Note that certain stations do not reflect the actual end pdm.

** Data was not obtained due to powder problems at the station.

*** Some data not obtained due to equipment malfunction.



SUISUN MARSH PROGRAM WATER QUALITY MONITORING AND CONTROL FACILITIES